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ABSTRACT

The paper reviewed current evaluative studies of career education programs across the nation concerning the interrelationship of career education and academic achievement. Information sources included: ERIC, Washington, D.C. Offices of Development Associates, Inc., National Institute of Education, Office of Career Education, Office of Vocational Technical Education, participants of Office of Education 1974 career education miniconferences, State coordinators of career education, and various project directors and school administrators. Career education program data produced in the McKeesport, Pennsylvania Schools correlated good work habits with academic success (planning activities increasing 14%, implementation activities 16%, and nonproductive activities decreasing 38%). Assessment of many programs included information concerning improved self-concept or self-esteem of students; related research has indicated self-concept to be a major contributor to achievement and a construct distinct from ability. Seventy-seven percent of the teachers in the Sacramento Unified School District indicated that career education greatly increased pupil motivation for class work. Similar support was given by teachers in many locations. Further followup studies concerning career education and academic achievement are recommended. An eight-page bibliography is included. (Author/EA)

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THE EFFICACY OF CAREER EDUCATION, ACADEMIC ACHIEVEMENT

PRESENTED TO

THE NATIONAL ADVISORY COUNCIL
ON
CAREER EDUCATION

Prepared by

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INTRODUCTION

On January 23, 1971, Commissioner of Education Sidney P. Marland, Jr. (1971), in his speech entitled "Career Education Now," delivered to the Convention of the National Association of Secondary School Principals in Houston, Texas, launched career education into the mainstream of educational thought. In the approximately five years since that time career education has progressed from a much-discussed idea to many well-developed programs have not been functioning very long, it is possible for them to have had an impression on students.

What data are there regarding the effects of career education on students' academic achievement? Is career education enabling the student to successfully meet his goals in school? Exactly what are the goals in American education? In the early nineteen hundreds, the seven cardinal principles of education espoused by the Commission for the Reorganization of Secondary Education (1918) defined the role that the school should play in the teaching of the student. Even at that time, emphasis was placed on "vocational preparation, citizenship, and the worthy use of leisure time."

A few years later, Dewey (1931) expressed the view that school subjects could be correlated with industrial education if educators gave priority to educational values rather than industrial or vocational goals. He indicated that the educational values would familiarize the learner with the social and cultural background of his vocation as well as the skills involved.

As time passed, the emphasis in education shifted from the fulfillment of societal needs to the desire to fill the needs of the student. Therefore, in the 1930's and 1940's, the experiences of the learner were stressed. Unfortunately, "experiences" is a rather broad, undefined term so that although the child was the original prime consideration, experiences were simple justified for their own sakes. There were no means to adequately measure them.

The beginnings of the space age in the 1950's, however, brought about an abrupt change in educational concern. The child was still considered important, but his needs were actually placed in a secondary position to society's needs for him. The student was saturated in the sciences, math--all the technological fields that would enable the United States to keep up with her global neighbors. There was numerous ideas, principles, and theories that the school <u>should</u> teach and which the child <u>should</u> learn, whether his personal goals included the need for that knowledge or not.

Recently the emphasis changed once more. The public is demanding that schools be accountable and that education be relevant to the student. As a result of these demands, the 1960's and 70's saw an increase in innovative teaching strategies, such as individualized and personalized instruction, computer-assisted instruction, and utilization of multimedia. Since the goal is to teach the concepts that the individual learner needs the most, it is only logical for career education to be in the forefront.

Proponents of career education stress the need to enable students to acquire the necessary academic skills and attitudes about work, leisure, and education so that they can adapt to change, can be skilled in certain career areas that best suit their abilities and interests, and can be mentally acceptant of furthering their education and retraining for jobs throughout life. Because of the rate of change in today's society, it is illogical to assume that any educational program is terminal. In order to be better prepared to cope with change, young people need not only to become cognizant of the effects of technology on people's occupations and lifestyles, but they must develop also a strong foundation in basic skills. Skills in planning, predicting, creating, and adapting will become basic skills in a school context, according to the Texas Association for Supervision and Curriculum Development Task Force in School Curriculum Design for the 1980's. Opportunities must be provided for students to develop attitudes that will contribute to self esteem and flexibility as well as a strong foundation in academic skills. Basic skills are essential to each individual as he or she develops for his or her respective role in society. In the Fourth Annual Gallup Poll of Public Attitudes Toward Education (1972), the number one priority among respondents was that the schools should teach students the skills of reading, writing, and arithmetic.

Gene Bottoms (1972) views as one necessary objective of an elementary career education program enhancing students' acquisition of basic academic skills. This, in his opinion, can be done by providing an alternative to the more abstract learning style which has dominated as an approach to education.

What exactly is the relationship between career education and academic skills? Of the developmental tasks (Havighurst, 1964) that the child is to learn during middle childhood and adolescence, some of the most important are the acquisition of the fundamental skills in reading, writing, and calculating, the concepts necessary for everyday living, the selection and preparation for an occupation, and intellectual skills and concepts necessary for civic competence. Those tasks listed above are quite relevant to the work of educators at the elementary and secondary levels. When educators are aware of these tasks, they are better equipped to help a student identify his purpose for being in school and to see the best times to introduce certain tasks to the growing child. Once the student begins to master these different tasks such as the use of words and knowledge of the things for which they are symbols, he is better able to differentiate and integrate the world around him. As O'Hara (1968) pointed out, the more occupational words a student knows, the more he will be able to differentiate and integrate within the occupational world. However, since people of the world outside the classroom also make great use of symbols in the auditory and visual realm, it is crucial that the student also become auditorially and visually literate. Thus, the fundamental skill of communication includes communication in all its forms--print, auditory, and visual. Communication and computational skills are identified by career education writers as the most marketable skills that the schools can help the student acquire.

In agreement, Leighbody (1968) has stressed the fact that academic learnings constitute not only the indispensable foundation

for job training and job security but are, in themselves, the most salable and most enduring job skills that a worker can possess.

In order to aid the student in accomplishing the necessary developmental tasks, varying career education programs have been instituted. Some schools have implemented separate courses at the secondary school level while others have organized units of work around the fifteen occupational clusters. The approach utilized by a large number of schools currently is that of the infusion of career education concepts into the ongoing curriculum. Infusion, according to Katz (1973) is not a fixed treatment. It is a variable responsive to individual need and uses.

Is the current emphasis on career education affecting students' success in academic areas? It is the purpose of this paper to report the findings pertinent to the effectiveness of career education efforts as reflected in the achievement of students in academic areas.

Good (1973) defined academic achievement as students' knowledge attained or skills developed in the school subjects, as designated by test scores or by marks assigned by teachers, or by both. An extensive survey was made of available studies reporting the evaluation of academic achievement of students in school-based programs, kindergarten through grade twelve, and students in school-based programs, kindergarten through grade twelve, and students in experience-based career educati . programs. Primary emphasis is given in this paper to studies in which experimental and quasi-experimental designs were employed and the analysis of "hard data" was reported. Since the informational needs of the local practitioners differ from those of educational planners

at the state and national levels, some data which does not meet local needs but not the rigorous standards of scientific investigation are briefly reviewed.

Examination of studies relating to the effects of career education programs on academic achievement was largely restricted to those studies which included data collected between 1972 and 1975. Few of the goals and objectives given for the implemented programs included statements regarding students' achievement in the academic areas. Understandably, few program evaluations included data relative to such achievement.

In order to obtain the information herein reported, the following methods were utilized: three searches of the ERIC system were requested; the Washington, D.C. offices of Development Associates, Inc., National Institute of Education, Office of Career Education, and the Office of Vocational Technical Education were visited; letters were written to all participants in OE's 1974 Career Education Mini-Conferences and to all projects and individuals named by Mini-Conference respondents; materials sent in response to letters to state coordinators of Career Education; telephone calls were made to all regional offices of the U. S. Office of Education. Telephone conversations were conducted with project directors and school administrators in a number of locations throughout the nation. With two exceptions, all of the project people who were asked to supply information did so.

REVIEW OF STUDIES

During the 1974-1975 school year a main thrust of the elementary school level career education program of the Ceres, California, Unified School District (1975) was the determination of the impact of the program on academic achievement. The overall gain made by pupils in grades one through six in reading was twelve percent. In math a gain of eleven percent was indicated. Using chi-square, a comparison was made of the percentage of students scoring on or above grade level on the Cooperative Primary Text and the Comprehensive Tests of Basic Skills (grades 4-6) in May, 1973 and May, 1974.

The percentage of students scoring at or above grade level in 1973 and 1974 is shown on the following table, along with the percentage of gain.*

MATH

Grade	Percentage at or above grade level 1973	Percentage at or above grade level 1974	Percent of Gain
1	31	52	21
2	32	32	NG
3	29	46	17
4	25	29	4
5	23	32	9
6	28	34	6

*Information given via telephone by Virginia Lish, Curriculum Specialist, Ceres

READING			
Grade	Percentage at or above grade level 1973	Percentage at or above grade level 1974	Percent of Gain
1	33	52	19
2	27	34	7
3	26	30	4
4	24	35	11
5	15	35	20
6	28	36	8

The foregoing information was gathered during the third year of a three-year project designated CERES (Career Education Responsive to Every Student). Approximately two thousand elementary students were included in a general impact program, with about forty percent of the students participating in a concentrated career education program. Teachers of children in the experimental group were involved in a staff development program during which they analyzed career education objectives as well as the reading and math needs of students in their classrooms. The teachers, who also learned to utilize an infused approach to curriculum development, had consultant help available from elementary principals, resource teachers, and a curriculum specialist.

David Huffman (1975) of Pittsburg, Kansas, sent a letter along with the report of a project being conducted under Part D of Public Law 90-576. Mr. Huffman wrote: "It was interesting for us to note that all those activities we have involved teachers and students in during this school year (by activities we mean those experiences we call part of our career education emphasis) did not take away from

academic achievement, but in fact, achievement gains were significant." In the project schools an analysis was made of students' scores on Metropolitan Achievement Tests which were given in September, 1974, and April, 1975. A distribution of frequency for both pretest and posttest scores of 233 third-grade students was compiled, and this was tested for significant differences using a chi-square procedure. Statistically, the difference in frequency between the pretest and posttest was significant at the .001 level ($p < .001$) on all nine tests. The third grade of a parochial school which did not have career education was used as a control group. It was concluded that there was no statistical significance between the scores of the two groups; the academic achievement of third graders in Unified School District No. 250 (Kansas) was equal to that achieved by students in the parochial schools of the community.

The pretest and posttest scores of 261 sixth graders were compared in a manner similar to that used with the third-grade scores. In the test for language the distribution of scores was not statistically significant, but it is noteworthy that the group mean was 6.2 (grade equivalent) in September and 6.7 in April. In nine other subtests the differences between pretest and posttest scores were statistically significant at the .05 or higher level of confidence. Six of the tests were significant at the .001 level ($p < .001$). It was concluded that there were no statistically significant differences between the academic achievement of the experimental and control groups. The overall academic achievement of sixth graders in the experimental group was comparable with that of students in the control group.

Of thirty possible comparisons, on the Self Observation Scales, the sixth graders in the experimental group exceeded the national average percentile of 50 in 24 of the 30 situations. They also exceeded the Average Percentile Score of the control group in 28 of the 30 comparisons on the scales.

Ninth-grade students in the career mathematics classes were given the ABLE test, forms A and B, as pretests and posttests to determine their achievement in mathematics skills. The instrument used is a standardized test covering thirty areas of mathematics.

A frequency distribution was compiled for four groups totaling fifty-four students for the pretest and posttest. The difference between the pretest and posttest distribution of scores was significant at the .001 level ($p < .001$) of confidence.

In Prince George's County, Maryland (1975), a study was conducted to determine the effects of integration of career education into the existing instructional program of selected schools. A primary focus was upon the effects which the career education program had in the area of basic educational skills.

The school staff in each participating school determined the method of implementation of the career education program. Classroom guidance, workshops, and limited financial assistance were provided by the school system to facilitate the integration of career knowledge, job attitudes, community/parent visitation program into the curricula.

Classes of grades 1, 3, 6, 7, 9, 11, and 12 of fourteen schools were selected for study. Schools which were used as controls were

matched with the experimental schools on five variables. Individual classes were combined across schools within grade levels to form experimental and control groups.

Thirteen data-gathering techniques were utilized in addition to the Iowa Tests of Basic Skills and the Iowa Tests of Educational Development. Posttests were given during the last school month of the 1973-1974 school year. The primary analysis techniques were the one-way analysis of variance and two sample tests.

The experimental samples scored significantly higher ($p < .01$) in reading and arithmetic than the controls. Exceptions were sixth-grade reading and senior high language usage and social studies. The writers recommended that follow-up evaluations include a pretest-posttest design in order to assure that equivalent groups are used and that differences found on the posttest can be tied better to the effects of career education.

The comprehensive career education model implemented in the schools of Lincoln County, West Virginia, is described in a monograph by Olson (1974). The three-year program was initiated in eight elementary schools, grades one through six in 1971. Of the student population, 887 students were involved in the career education program and 1,549 were not.

Staff development activities were provided for twenty-nine faculty members who subsequently implemented career education in their classes. Teaching strategies of field trips, resource role models, manipulative activities, simulation, and multimedia activities were incorporated into instructional resource units utilized with the experimental groups.

Posttest data were analyzed for 415 students who, in May, 1972, were given the California Language Achievement Test and the California Mathematics Achievement Test. The experimental students were randomly selected from intact classes of students involved in the Career Awareness Program while the control students were selected from the remaining students who had not participated in the Career Awareness Program.

In order to provide for an unbiased comparison of the effects of the treatment, the analysis of covariance was employed. The adjusted posttest means for the experimental group were 11 percent higher than the adjusted posttest means for the control group on language achievement.

Data produced from the analysis of covariance on mathematics achievement indicate that the difference between the experimental group and the control group was significant at the .01 level ($p < .01$). The adjusted posttest means for the experimental group were 24.5 percent higher than the adjusted posttest means for the control group on mathematics achievement.

Among the implications based on the finding of the study were:

> (1) "utilizing experimental activity to illustrate abstract symbols and concepts related to career education goals (life goals and academic subject goals) is an effective method of increasing academic achievement, and (2) in-service education which focuses on both process (human relations) and task (planning, development, implementation) components is effective in delivering career education activities to elementary and secondary students." (Olson, p. 21)

An exemplary project in career education began in July, 1974, in the Union County Schools of North Carolina (1975). According to a

publication supplied by Dr. John Moore, the project was funded under Part D, Public Law 90-576, and was aimed at implementing a career-based curriculum. During the 1974-75 school year, twenty elementary, middle, and secondary schools were involved.

Major program activities during the first year included staff development for personnel at all levels, K-12, development and implementation of curriculum units stressing integration of career education into the academic disciplines, provision of group guidance and the establishment of a career center in the library.

Use of the community as a classroom was stressed for all grade levels of the participating schools. At the elementary school level, the academic instruction was to be related more closely to the "World of Careers" through a Career and Self-Awareness Program. In the middle schools, a Career Exploratory Program included a "hands-on" approach in fifteen occupational clusters, a Guidance and Counseling Program, and Instructional Modules which related to students' academic and career-exploratory experiences.

The research question posed, which is pertinent to this paper, was: Have student grades, attendance, achievement, and attitudes improved as a result of the Career Based Curriculum? A pretest-post-test design was not possible; data were collected in the spring only. Reading and mathematics achievement test results from September, 1974, and March, 1975, were available and were utilized. Scores were expressed in grade equivalents.

From a student population for grades K-8 of approximately 3,000, students in grades 3, 6, and 7 were randomly selected. From schools identified as having students comparable to those in the project schools, sixty third graders and sixty sixth graders were randomly selected. Twenty-five seventh graders were chosen from the two control schools.

One-way analysis of variance and multiple regression were applied to the data. Mean grade equivalents were the same for all groups in September for reading and mathematics. Although the third-grade project group achieved slightly more than the control group in both reading and math, the differences were not statistically significant. At the sixth-grade level, the difference between the two groups in reading was statistically significant, with the difference favoring the experimental group. Although the difference between the two sixth-grade groups in mathematics was not statistically significant, the experimental group showed a greater gain.

A descriptive evaluation was given by Lapinski (1972) of an interdisciplinary career assessment program for fifty-four slow learners and disadvantaged youth at the high school level in Stamford, Connecticut. The cluster concept and correlation of classroom materials to occupational assessment and skill training were essential to the program. One objective of the program was the development of basic skills; in one part of the evaluation, the Science Research Associates' Basic Skills in Arithmetic Test were used as pretests and posttests.

The sixty-four students in the study showed an average gain of 1.7 years at the ninth-grade level and 1.3 years at the tenth-grade level. The ninth-grade gains ranged from 1.0 to 3.7 years; the tenth-grade gains from 0.0 up to 2.8 years. At the conclusion of the study, the arithmetic scores of the group of slow learners and disadvantaged students ranged from 5.6 to 10.5 for ninth graders and 4.6 to 9.9 for tenth graders.

The study which is descriptive in nature cannot provide a basis for comparison of results such as can be provided by a control group. The researcher did report that a check of five students who were in the program the previous year and who were re-tested a year later indicated that the students maintained and improved their grade-level scores.

In a study conducted by Solomon (1973) a local career education program was evaluated to measure the effect of the program on academic achievement and career development. Forty fifth- and sixth-grade experimental group students were compared with forty fifth- and sixth-grade matched controls from another school. The Mathematics and Reading tests of the Metropolitian Achievement Tests were two of the posttests administered. No significant differences were obtained on any measure, indicating that occupational and self-awareness did not impede growth in scholastic areas.

In a study involving 348 elementary students in North Central Texas, Bryant (1975) found that academic achievement was increased through the implementation of career education program. Randomly-

selected schools in a ten-county area participated in the study which was part of a larger dissemination effort jointly sponsored by Education Service Center Region XI and Partners in Career Education. Seventeen fifth-grade classes in five school systems participated. Within the three larger school systems, both experimental and control classes were identified. Classes in the two smaller school systems were matched with control classes in other school districts.

Teachers in the experimental group participated in three days of staff development and were given teacher-developed career-education curriculum guides for use in planning instruction in language arts and social studies classes. Consultant help was provided teachers on a request basis.

Forms Q and R of the Comprehensive Tests of Basic Skills were administered as pretests and posttests in October and February of the 1974-75 school year. Adjusted means were used in the analysis of the data; analysis of covariance was the basic statistical procedure employed. Statistically significant differences between the two groups were found to exist on the scores of the total achievement battery ($p < .001$), Reading Test ($p < .01$), Language Test ($p < .00$), and Study Skills Test ($p < .01$). Differences that were statistically significant at the .001 level ($p < .001$) were indicated in the Vocabulary, Language Expression, and Reference Skills subtests. All differences favored the experimental group.

Career-education concepts were not introduced into the arithmetic curriculum, and no greater gain was made in arithmetic by the experimental group than was made by the control group. The findings supported the conclusion that the infusion of career-education concepts into the ongoing program of curricular offerings can have a positive effect upon the cognitive growth of students as evidenced by achievement test scores.

A three-year occupational information project for grades 1-12 was implemented in the schools of Henderson County, Kentucky. The Comprehensive Test of Basic Skills was used along with the Barclay Classroom Climate Inventory and other instruments to assess the value of the program. No negative effects on students' scholastic growth was reported. It was concluded by the researchers that the school had changed from a traditional subject matter orientation to a more life-centered one.

In a manuscript entitled, "Evaluation of Career Education: Implications for Instruction at the Elementary School Level," Hoyt (1975) referred to results reported by Clifton Purcell of the Santa Barbara, California, career education program in 1974. The Cooperative Primary Reading Test was administered to second grade students in a class in which career education approaches were emphasized and in a class not involved in such an approach. The scores for the students in the career-education-oriented class were significantly higher, statistically, than the scores of the other students tested. Mr. Purcell is no longer with the school district and a copy of the study was not made available.

Director James Spengler of the Board of Cooperative Education Services (BOCES, District One, New York) (1975) provided information regarding the preparation and field testing of curriculum materials designed to infuse the career educatior concept into the normal academic curriculum. The development of the Career Education Instructional System is part of the effort of the New York State Consortium for Career Education.

The first year of the project was one of planning and development during which twenty-one school districts in Erie BOCES #1 and #2 participated. One hundred teachers, counselors, administrators and media specialists were oriented and trained to prepare curriculum packages in language arts, math, science and social science at all grade levels. Fifty-two Learning Activity packets, including 900 Learning Activity sheets were prepared, evaluated by experts, revised and printed.

Following summer orientation, three hundred teachers used the packets in their classrooms. Teachers' evaluation indicated high student interest during activities in which the infusion technique was used. An examination of pre- and post-achievement testing indicated slight gains in the twenty-eight test cells (grade level--subject) for which data were obtained. Two cases were statistically significant in achievement gains during the first year of field testing.

During the 1974-75 school year, the reported high interest of students using the packets was verified by independent survey of students. Examination of pre-and post-assessment indicated increases

in achievement again in all but five of the sixty-four test cells. In sixteen cases the gains, experimental over control, were statistically significant. Improvements were shown in cells representing 223 students in fifty-nine classes, or twenty-six of the classes.

Included in a career education program in Elhart, Indiana were eighth and ninth-grade students in an inner-city school. Objectives were to enable the students to increase their reading and comprehension levels and to increase their career options. Participants in the program were functioning at reading levels four or more years below their grade level. Directed activities utilizing workbooks were provided the student for one period per day. Fourteen learning excursions into the community were made by the group during the year.

Scores of students indicated growth gains in language and reading skills that ranged from .6 to 3.3 years. The average gain was 1.5 years.

The three-year developmental career education program in Cobb County, Georgia, was reported by Smith (1973). The project's efforts produced a broad-based, developmental, sequential curriculum within elementary, middle and secondary schools. The project by design and by nature placed special emphasis on those students who were culturally, economically or otherwise handicapped or disadvantaged.

An objective of the program was to integrate a career development program into existing curriculum to enhance traditional academic learning. A product objective to increase student academic achievement as measured by achievement tests was partially attained. The

evaluation was based upon results of the regular school administration of Iowa Tests of Basic Skills to third, fourth, and sixth-grade students in September, 1972. At the third-grade level, the average grade equivalent score for experimental and control students was 3.35 (comparison made to grade equivalent of 3.1).

The fourth-grade students were tested in October, 1972, and the expected grade equivalent score was 4.2. The overall mean score for the project schools was 4.15; the average score in the control schools was 3.95.

The overall grade equivalent scores of sixth-grade students in the project schools exceeded the expected grade equivalent score by .2 while the score in the control schools was .2 less than the expected grade equivalent. The overall means for the project schools were equal to or higher than the overall means of the control schools at each of the three grade levels tested.

One of the goals of the Cobb County program was to create opportunities for the student to utilize the subject matter in manipulative learning situations. Another goal was to provide opportunities for the student to observe the practical application of academic subject matter in the work community.

From a first-year project involving twenty-four teachers in four elementary schools, the program was expanded to include forty-eight teachers the second year. In a "teacher-helping-teachers" approach, thirty-four Cobb County schools were eventually included by the third year.

This project demonstrated the feasibility of a transportable career education program that involved little expense and was maintained as an integral part of the educational experiences of all pupils at no extra cost. One evaluation that was meaningful to the local planners was the fact that the school board voted for expansion of the program to all schools.

Math sections of pretests and posttests administered to selected third- and fourth-grade students in Calhoun County, Michigan, (Simpson, 1974) incorporated various math functions such as multiplication, addition (shaded figures), angles, fractions, points and lines, notations, and division. Both the experimental and the control groups showed little or no change on the multiplication section, which apparently was too difficult. For the remainder of the items in the math section of the test, the two groups scored about the same, supporting the hypothesis that academic competence (as measured by a math test) would not be impeded as a result of the implemented career education program.

Following the rationale that career education is for everyone, different schools have provided programs for slow learners, potential dropouts, disadvantaged students, and accelerated learners. In the McKeesport Area School District of Pennsylvania, (1974) pretests and posttests were administered to elementary students in the academically talented program. Of the eighteen units attempted, fifteen showed statistically significant student improvement between pretests and posttests. "Several of the improvement rates were quite startling with a 1706 percent improvement being observed in the Minerals and Gems unit and 1250 percent growth noted in the Forestry unit."

(McKeesport, p. 26). The program for the academically talented was highly successful.

Selected elementary students in regular classes in the McKeesport District were also tested in regard to eleven career education units. Those children engaged in Anthropology, Senses and Agriculture units showed statistically significant improvement. The other units, while failing to reach the statistically significant level, showed general improvement.

In Philadelphia a prototype experienced-based career education program has been developed, operationalized and tested by Research for Better Schools, Inc. The four years of the career education program have encompassed one year at the planning stage and three additional years at the operational stage. According to Kershner and Blair (1975) the evaluation activities during the first year of operations were largely formative in nature. Data were collected on the extent of implementation, perceptions of participants, and student progress on several criterion measures. No comparison groups were available to establish external standards or determine effects of the program.

During the 1973-1974 school year, 250 students were released by the School District of Philadelphia to participate in the program. The report of the interval evaluation staff focused on the 38 first-year students who completed all of the testing. Data given for another group of 54 students is not reviewed here because no comparison group was available.

The Experienced-Based Career program included three types of instructional activities. First, students spent at least one day a week engaging in wide variety of "hands-on" activities conducted at the work sites of over eighty participating industries, businesses agencies and unions. Second, structured small group guidance sessions were held each week in addition to individual counseling that was provided. For an hour and a half each day students were given individualized learning opportunities in communication skills and mathematics. A teacher-student ratio of 18.44 to 1 was reported.

All students were administered a pretest-posttest series of instruments which included the Comprehensive Tests of Basic Skills. Levels and Forms of the tests used were not specified in the material reviewed. Hypothesized growth within groups was tested through the use of correlated t-tests. In all studies reported herein except those relating to evaluation of Experience-Based Career Education projects, a .05 of .01 level was established as a level of significance.

All of the tests run on the experimental group demonstrated a statistically significant ($p < .10$) growth in reading and math. In addition to a total reading and arithmetic scores, scores were obtained on vocabulary, comprehension, computation concepts, and applications.

Analysis of covariance revealed no statistically significant differences between the gains of the experimental comparison students except for a difference, favoring the experimental group, in Arithmetic Application.

Highly positive attitudes toward the program were reflected by students, parents and employers. The experimental students gained significantly in career maturity and attitude toward school.

Indications were that useful data should result from the evaluation of the 1974-1975 program because a true experimental design was implemented and, for the first time, students were randomly assigned to treatment and non-treatment groups. Data were not available in early October, 1975.

Northwest Regional Educational Laboratory made an evaluation of students in another Experience-Based Career Education program. Using the subtests of the Comprehensive Test of Basic Skills, as pretests and posttests, evaluation was made in the areas of reading and math. A statistically significant gain in reading was shown by students in the experimental group; the gain was not statistically different from that shown by the comparison group. On a newspaper-reading exercise designed to assess the applied reading skills of a sample of students, statistically significant growth over the year was demonstrated.

Individual study, individual tutoring, and application of skills in practical situations were all employed to help students increase their ability in mathematics. Scores on the math subtest of the CTBS showed that students in the experimental group made a statistically significant increase in their scores in this area. EBCE students on the average increased their grade equivalent scores .7 years. This

compares to a decrease of .1 grade equivalent shown by the comparison group.

Through the administration of the Iowa Tests of Educational Development on a pretest-posttest basis the Far West Laboratory sought to determine the effects of an Experience-Based Career Education program on thirty-six students at the tenth-, eleventh, and twelfth-grade levels. The tests were given to students in the experimental and to control groups and comparison groups from the Oakland Public Schools during November and May of the 1973-1974 school year. Grade-score equivalents were used in the analysis of the data.

Analysis of covariance of the math and reading scores for the two groups indicated that, even though the experimental group had a greater average change on the math test than did the control group, the difference was not significant. On the reading test, the regressions of the May scores on the November scores were significantly different at the .10 level. Thus, there was no accurate test of the significance of the difference in means.

A positive change in writing skills was observed by more students in the experimental group (38%) than in the control group (14%). Writing samples were collected from the experimental group at the beginning; samples were not available from a control group Writings of the Far West School students were collected at the end of the school year and judged with respect to three characteristics: mechanics of writing, effectiveness of communication, and maturity or logical thoughtfulness. Four experienced test readers refined

the draft definitions of each of the three characteristics and described a five-point scale in each area. For purposes of estimating the reliability of the ratings assigned for a given characteristic, there were eight ratings for a particular student (four raters for pretest scores and four for posttest scores). This yielded six interrated correlation co-efficients for the pretest and six for the posttest. The Spearman-Brown Prophecy Formula was applied to the median correlation co-efficients. The estimated reader reliability of the average ratings for each student on the Mechanics and Effectiveness scores were quite high. The reliability of the Thoughtfulness score was not high, but the score was used because no data were available for a better measure on the important characteristic.

The distribution of the differences in individual scores on the pretests and posttests showed that the percent of students whose written communication scores increased by more than one standard error of the difference was much higher than would be expected (15%) if there had been no increase for the group as a whole. Approximately 55% of the students showed a significant increase in Mechanics and Effectiveness, and none of them showed a significant loss in these skills. Two students showed a significant loss in Thoughtfulness and 41% showed a significant increase.

In summary, a large proportion of Far West School students showed increases in their writing skills that were both statistically and educationally significant. This was the only study reviewed that included an evaluation of students' compositions.

In a final evaluation report on Experience-Based Career Education, Appalachia Educational Laboratory reported that the ninety-two EBCE students did as well as the comparison groups on scholastic growth. Data sources included the subscores on Educational Development Series (EDS) and Iowa Test of Educational Development (ITED). All of the students were given EDS during the fall of their eleventh-grade year and the complete battery of the ITED upon entry into the EBCE program and again in April. Comparison groups were not given the ITED.

A multivariate analysis of variance was used to compare the EDS pretest mean scores on the six subtests over the three groups of students (EBCE, Coop and randomly chosen). The resulting F value was found to be significant at the .05 level ($p < .05$).

A visit to the offices of Development Associates and perusal of An Evaluation of Vocational Exemplary Projects did not produce data pertinent to the specifications of this paper. The evaluation report did contain the evaluators' commendations of the United States Office of Education and especially the program staff of the Department of Vocational Technical Education for actions taken to improve both the content and the management of federally-funded programs. Some of the evaluations reviewed in this paper are of programs conducted during the 1973-1975 school years under the revised management procedures.

CONCLUDING STATEMENTS

In his analysis of the lifelong process of vocational development, Havighurst (1964) has identified the second stage as "Acquiring the Basic Habits of Industry." Learning to organize one's time and energy to get a piece of work done (school work, chores) and learning to put work ahead of play in appropriate situations are aspects of the stage. Assuming that good work habits are possibly correlated with academic success in today's schools, attention is called to data produced in the McKeesport, Pennsylvania Schools.

An indicator of student success in the career education program there was the shift in type of student activity. Time devoted to planning activities increased 14% ($p < .05$) and 16% ($p < .01$) more time was spent by students in implementation. Although 8% more time was spent in evaluation, the increase was not significant. Statistically significant ($p < .01$) was the reduction by 38% in the amount of time spent in non-productive activities. The categorization of the students' behavior was based on Time series sampling by multiple observers not involved in the treatment. Additional emphasis upon problem-solving and critical-thinking abilities was given through the career education program.

Assessment of many programs included information concerning the improved self concept or self esteem of students. The final report of the research and development career education project in Raleigh, West Virginia (1974) cited relationships among self concept, ability and achievement. Results of the

study showed that for seventy-two students at the third-grade level, self concept (as measured by the Self Observation Scales) accounted for 13.5% of the variance in predicting ability and 21.2% of the variance in predicting achievement (as measured by the Education Development Series test battery). These findings were consistent with the research data of IBEX, Inc., which indicates that self concept is a major contributor to achievement and is a construct distinct from ability (Klaus, 1974).

Seventy-seven percent (77%) of the teachers in the Sacramento Unified School District indicated that career education greatly increased pupil motivation for class work. Sixty-three percent (63%) said that pupils were more interested in school projects as a result of career education. Similar support was given by teachers in Richmond, California, as well as in many other locations.

If students have good feelings about themselves and positive relationships with others, school achievement may increase. Hoyt (1975) points out that positive relationships have been established between productivity and reduction of worker alienation. He maintains that educational productivity--increases in academic achievement--should result if worker alienation is reduced among students and teachers. Many of the techniques and strategies of implementing career education programs are aimed at reducing worker alienation among students and teachers.

Evaluations of a number of school-based career education programs reflect satisfaction of students, parents, educators,

and other community members with the goals, activities and results of the implemented programs. Continued support of the exemplary projects, expansion of pilot-school programs to encompass entire school systems or countrywide units, and records of community involvement are described in reports. These "soft data" and numerous other supporting materials appear to reflect the information needs of many educators at the local level. Reading the wording of program goals and objectives, one might infer that local planners concurred on a basic assumption that academic achievement would not be impeded by making the curriculum more relevant to the world of work and emphasizing the career development and guidance of children and youth.

Communication of goals and objectives or programs to educators at various levels is essential to evaluation. The Union County, North Carolina (1975) study included a recommendation that teachers be encouraged to devise activities with specific objectives in mind for their instructional units and lesson plans. The failure of the middle school students to outscore the control students "indicates that the objectives as understood by the evaluators are not consistent with those of the lab teachers."

Parties involved in programs do not always communicate among themselves their separate criteria for acceptable evaluative data. Different levels of evidence of the efficacy of career education are acceptable to people functioning in various educational roles. Information considered to be most

useful is not always that which is rigorously obtained. Support to the two foregoing statements is given by examination of the variety of materials sent in response to requests for hard data to be reviewed for this paper. The materials are listed in the bibliography.

Commissioner Bell (1974) has stressed the importance of maintaining the grass-roots-level initiative for career education. An aid in balancing federal and local support may be the development of innovative evaluative procedures that can result in assessment information needed at state and national levels as well as in data that is useful at the local level.

Although this paper does not represent an exhaustive review of evaluations conducted, it does, to the greatest extent possible, contain reviews of studies currently available. Indications are that the evaluations of many 1975-1976 programs may contribute substantially to the knowledge now available concerning the interrelationship of career education and academic achievement. Soft data have indicated that positive changes in the self concepts and work habits of some students have taken place. Follow-up studies, indeed, may net more hard data that career education can aid the development of students' acquisition of the fundamental skills--reading, writing, and arithmetic.

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